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## LONG TERM IMPACT OF FINANCIAL SYSTEM ON IMPORT DEMAND FOR TURKEY

### *FİNANSAL SİSTEMİN İTHALAT TALEBİ ÜZERİNDEKİ UZUN DÖNEM ETKİSİ: TÜRKİYE ÖRNEĞİ*

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**ABSTRACT:** In this study, we aim to analyze whether a shock in a component of the financial system affect import demand on the long run. In this regard, we include components of financial system into the import demand function and employ long run SVAR method. We analyze the eight period from the beginning of “Transition Program for Strengthening the Turkish Economy”.

We conclude that import demand responses affect positively a national cash flow shock. Relative prices shock affects import demand positively, as expected. There is a number of variables belonging to a financial system which induces import demand. According to results, the financial system influences the import demand and policymakers have to take into account the interaction between import demand and financial system in the policy-making process.

**Keywords:** Import Demand; Long-Run Structural VAR; Financial System

**ÖZET:** Çalışmada finansal sistemin uzun dönemde ithalat talebi üzerindeki etkisini görmek amacıyla, finansal sistem bileşenleri ithalat talebi fonksiyonu içerisine yerleştirilmiştir. Bununla birlikte eleştiriler doğrultusunda ithalat talep fonksiyonu içerisinde gayri safi yurt içi hasıla yerine ulusal nakit akışı değişkeni kullanılmıştır. Çalışmada finansal sisteme ait bir değişkenin uzun dönemde ithalat talebi üzerindeki etkilerini görmek amacıyla uzun dönem yapısal VAR metodolojisi kullanılmıştır. Kullanılan veriler "Güçlü Ekonomiye Geçiş Programı"nın uygulanmaya başladığı tarihten itibaren günümüze sekiz yıllık dönemi kapsamaktadır.

Çalışma sonucunda ulusal nakit akışının ithalat talebi üzerinde pozitif bir etkisinin bulunduğu, göreceli fiyatların ise ithalat talebini beklendiği gibi uzun dönemde pozitif etkilediği görülmüştür. Finansal sisteme ait değişkenlerden bazılarının ise ithalat talebi üzerinde anlamlı etkilerinin olduğu sonucuna ulaşılmıştır. Sonuçlar politika yapımcılarının politika kararlarında bu etkileşimi dikkate almaları gerektiğini göstermektedir.

**Anahtar Kelimeler:** İthalat Talebi; Uzun Dönem Yapısal VAR; Finansal Sistem

**JEL Classification:** E44; F41

## 1. Introduction

At the end of 20<sup>th</sup> century, globalization has become an important matter because of evolution in communication and transportation technologies. Structures of financial markets and commercial transmission mechanism have changed in conjunction with globalization. The development of communication and transportation technologies have simplified to reach international market and to trade into there as well. In this

regard, globalization may be thought of as the integration of economies through capital flow, trade and information technology (Mubiru, 2003: 3).

Hereafter, an increase in international trade has had a major role on macroeconomic policies because of the fact that its effect on economy and interdependence of macroeconomic policies has increased between trading countries. Determinants of import and export have become important variables for both policymakers and economists. So, determining the components of export and import demand would help to control balance of payments and to give incentives to right sectors to support.

A number of economists have studied to identify variables affecting import and have tried to construct an import demand function. In these studies, different variables are included into models and practiced several different kind of methodology in order to get robust stable import demand function. In this context Khan (1975) implied that marginal propensity to import is dependent on the composition of income, while Leamer and Stern (1970) emphasized that real GNP and relative price of import are explanatory variables used in total import demand analysis. In another study, Goldstein et al. (1980) connoted the indicators of import demand as importing country's level of income or real expenditure and the ratio of the price of imports to the price of domestic import substitutes. Faini et al. (1988) determined traditional import demand function by relating real imports ( $M_t$ ) to real income ( $Y_t$ ) and ratio of import prices ( $P_t^M$ ) to domestic prices ( $P_t^D$ ) which was estimated for fifty countries as follows:

$$\ln M_t = b_0 + b_1 \ln Y_t + b_2 \ln \left[ P_t^M / P_t^D \right] + v_t \quad (1)$$

where  $v_t$  is an error term with standard properties. Although equation built above could explain some portion of import demand, undertaken examination for most of countries, Faini et al. (1988) found import demand function unstable.

Import demand function was predicted by Shabbir and Mahmood (1991) for Pakistan, Carone (1996) for USA, Gregory and Hansen (1996) and Hamori and Matsubayashi (2001) for Japan, Dutta and Nasuriddin (1999) for Bangladesh, Tang and Nair (2002) for Malaysia, Tang (2002) for Indonesia, Chang et al. (2005) for South Korea. They analyzed import demand by using conventional variables such as income and relative prices. Although some of studies found significant results, a number of them found unstable and insignificant results for import demand.

To constitute stable and significant import demand function, authors have developed liberally models in their studies. Khan (1974) included import restrictions and tariffs as a proxy of import determinants. Murray and Ginman (1976) and Salas (1982) included import prices and domestic prices separately instead of ratio of import prices to domestic prices. Chu et al. (1983) used indicators of foreign exchange availability as a proxy for tend of government to impose import controls. Faini et al. (1988) focused on import controls to determine import demand also. Diewert and Morrison (1986) used producer oriented framework to model import/export demand and included domestic supply and labour demand to explain them.

Gumede (2000) examined import demand function by including exchange rates into equation. Narayan and Narayan (2005) built a model including relative prices, total consumption, investment expenditure and export expenditure variables to model a

stable import demand in a different way. Metha and Parikh (2005) included the index of non-tariff barrier for a specific commodity group into equation. Dash (2005) added real exchange rate reserve of importer country into its import demand equation in his study.

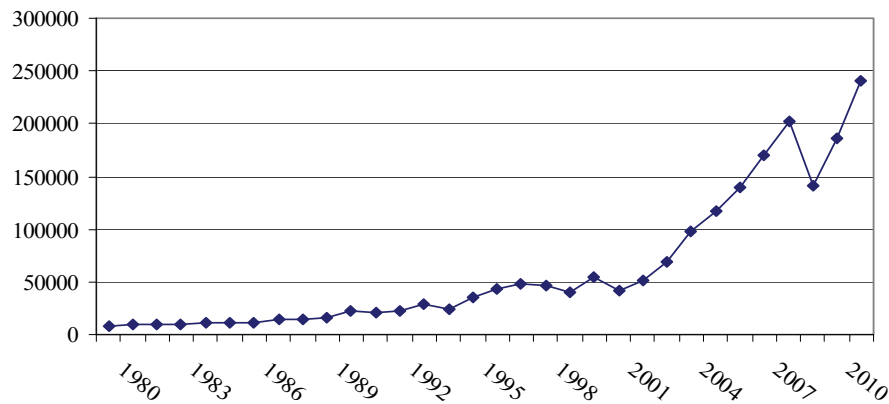
Also there is a vast literature examining Turkish economy. One of them belongs to Kutlar and Simsek. Kutlar and Simsek (2003) examined import demand of the Turkish economy between 1987 and 2000 by using Johansen cointegration analysis method. Gul and Ekinici (2006) and Barisik and Demircioglu (2006) analyzed 1990 - 2006 and 1980 - 2001 periods, respectively. Kutlar and Simsek (2003) and Barisik and Demircioglu (2006) found long term relationship between import, export and real exchange rate. Gul and Ekinici (2006) found no relationship between them contrary to findings of Kutlar and Simsek (2003). Kalyoncu (2006) and Bayraktutan and Bıdırı (2010) implied that real income is the main indicator of import demand in Turkey. Aydın et. al (2004) and Karagöz and Doğan (2005) are other studies examined Turkish import demand.

As indicated by Mubiru (2003), domestic financial markets participated into the international financial system as result of globalization process. Besides increasing volume of international trade, globalizing financial markets brings to mind question that whether developing financial markets have any effect on import demand. In initial study of Leamer and Stern (1970), credit was neglected to import and export demand function. This variable is meant to indicate the availability and terms at which credit is provided for the financing of imports. Such a variable will play important role especially in linking the current and capital accounts of the balance of payments (Leamer and Sterns, 1970: 16). They also emphasized that increasing interest in the capital account will surely provide a stimulus to increased examination of the effect of credit on imports and exports. An increase in financial system depth would provide alternatives for importing companies. A well built financial system would reduce risk-premium and it would cause decreasing costs. Better developed financial sectors have a comparative advantage in manufacturing industries (Deck, 2002: 107). According to Leamer and Sterns (1970), transaction volume in exchange market, stock market or total credit volume in banking sector is important indicators of financial system depth.

Deck (2002) included development degree of financial system in his analysis about foreign trade structure and examined linkage between financial development and structure of trade balance by using data covering thirty years between 1966 and 1995 belonging 65 countries. He employed the Generalized Methods Moments (GMM) and concluded that there is a link between the level of financial development and the structure of international trade (Deck, 2002: 129).

In another study of Tang (2004), he tried to construct more stable (or long run) import demand function for the Japanese economy between years 1973 and 2000. In order to achieve this, he put financial variables into function and analyzed by using co-integration methodology. He used ARDL bounds test, Johansen's multivariate approach and error correction model. He concluded that financial variables and monetary policies have important effects on import demand function for Japan economy.

By the beginning of export-led growth regime in 1980, international trade volume of Turkey has started to increase gradually. Besides, increasing export, total amount of import has started to increase. It was only 8 billion US dollar in 1980 and it increased to 15 billion US Dollars in 1989. Increase has continued in 90's and it reached to 40 billion US Dollars in 1999. By the beginning of stabilization program named "Transition Program for Strengthening the Turkish Economy", after the financial crisis in 2001, development of economy has affected all sectors and quantity of import has accelerated in this era. Quantity of total import was 41 billion US Dollars in 2001 and it was more than 140 billion US Dollars at the end of 2009. Import amount by years is shown in figure 1.



**Figure 1. Import Amount by Years (Million US dollar)\***

Financial system of Turkey has experienced structural change after financial crisis in 2001 also. In the stabilization program, government took regulatory decisions about the structure of Turkish financial system. One of the most important decisions was that the structure of state banks were aimed to regulate and governance of these banks ought to be improved. Another one was about stability of financial system and in this context, problems of wrecked banks existing in the Saving Insurance Deposit Fund (SIDF) ought to be solved in a short time. Also some regulations had to practice on private banking sector and to this end capital structure of private banks ought to be improved.

Accelerating import amount and re-structuring of financial system in 2000s provide room to re-examine import demand of Turkey. In this regard, we aim to re-construct import demand function of Turkey by including financial market to get long run import demand function and to see whether an evolution in financial market affected import demand of Turkey. The novelty of this paper is twofold. First of all, although the amount of export goods has increased in last decade, trade deficit is still an important problem for the Turkish economy because of high import volume. Re-examining the import demand and investigate whether a shock in financial system is effective on import demand are essential for the Turkish economy. In this regard, investigation of the interaction between variables would be useful for policy makers. Secondly, there is no study investigating the import demand of Turkey by including financial system components. In this context, this is the first study to our knowledge.

\* **Source:** International Money Fund, International Financial Statistics database, date: 25.07.2012.

The rest of paper is organized as follows. In the second section of the study, we build up model and introduce data used in econometrical analysis. The third section is about empirical results and in the last section conclusions are presented.

## 2. Data and Methodology

In our study we examine data between years 2002 and 2009. Because, structural change in financial system experienced by the end of financial crisis in 2001. We take monthly data into account and it is obtained from the Central Bank of the Republic of Turkey official website. In order to analyze the effects of financial system on import demand, we use five variables belonging system and these are explained in Table 1. Xu (2002) indicates that conventional import demand equations generally regarded as statistics and its empirical specifications are often criticized as ad hoc. In order to derive tractable structural import demand equation, we use gross domestic product, government expenditures, total investments and export data to calculate national cash flow (ncf) as mentioned in Xu's (2002) study.

Another variable which we include into function is relative prices (rp). We can use real effective exchange rate in order to introduce relative prices because of similarities in definitions of relative prices and real effective exchange rate.<sup>†</sup> For this reason, we use real effective exchange rate in our analysis instead of relative prices. Lastly, we employ total import value of Turkey (m) as dependent variable of analysis. Details of data are given in the following table. In order to deseasonalize the variables, we use TRAMO/SEATS program and we deseasonalize NCF and M data.

Also we take natural logarithm of all variables. To see effects of each financial variable, we build up import demand function for each variable of financial system, respectively. So we analyze five different import demand function like in the study of Tang (2004) to see individual effects of financial variables on import demand. In this context, we connote models for each variable as follows:

**Table 1. Data Set**

Variables	Explanation	Source
m	Import Value (TL)	CBRT
ncf	National Cash Flow (TL) (GDP - I - G - EX)	CBRT
rp	( Real Effective Exchange Rate Used)	CBRT
crd	Total Credit Volume in Banking Sector (TL)	CBRT
imkb	Istanbul Stock Exchange Transaction Volume (TL)	CBRT
exmar	Exchange Market Transaction Volume (\$)	CBRT
deprate	Interest Rate of Deposits (%)	CBRT
spr	Share Prices (TL)	CBRT

$$X_t = f(m_t, ncf_t, rp_t, crd_t) \quad (2)$$

$$X_t = f(m_t, ncf_t, rp_t, imkb_t) \quad (3)$$

$$X_t = f(m_t, ncf_t, rp_t, exmar_t) \quad (4)$$

$$X_t = f(m_t, ncf_t, rp_t, deprate_t) \quad (5)$$

$$X_t = f(m_t, ncf_t, rp_t, spr_t) \quad (6)$$

<sup>†</sup> For detailed information, see Nilsson (1999).

The variables included into model can be written in a system of simultaneous equations represented in vector form like in equation (7) as follows.

$$Ay_t = B(L)y_{t-1} + C\varepsilon_t \quad (7)$$

$y_t$  is a vector of endogenous variables,  $y_{t-1}$  is a vector of their lagged values and  $\varepsilon_t$  is white noise vector of the disturbance terms for each variable. This disturbance term captures any exogenous factors in the model.  $A$  contains the structural parameters of the contemporaneous endogenous variables and it is a  $n \times n$  square matrix.  $C$  is also  $n \times n$  square matrix and contains the contemporaneous response of the variables to the disturbances and innovations.  $B(L)$  is a  $s$ th degree matrix polynomial in the lag operator  $L$ , where  $s$  is the number of lagged periods used in the model.

There is a problem about representation with equation (7), because the coefficients in the matrices are unknown and identifying model is not possible in this form. But it is possible to transform equation into reduced form model to obtain standard VAR representation.

$$y_t = D(L)y_{t-1} + e_t \quad (8)$$

In equation (8),  $D(L)$  equals  $A^{-1}B(L)$  and  $e_t$  represents  $A^{-1}C\varepsilon_t$ . The error terms  $e_t$  are linear combinations of the uncorrelated shocks ( $\varepsilon_t$ ) such that each individual error term is serially correlated with a zero mean and a constant variance. The matrix  $\Sigma$  is the variance/covariance of  $e_t$  of the standard VAR. The  $\sigma^2$  is the variance and  $\sigma_{ij}$  are the covariance terms where each  $\sigma_{ij} = (1/T) \sum_{t=1}^T e_{it}e_{jt}$  and  $\Sigma$  matrix is represented as follows,

$$\Sigma = \begin{bmatrix} \sigma_1^2 & \sigma_{12} & \dots & \dots & \sigma_{1n} \\ \sigma_{21} & \sigma_2^2 & \dots & \dots & \sigma_{2n} \\ \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots \\ \sigma_{n1} & \sigma_{n2} & \dots & \dots & \sigma_n^2 \end{bmatrix} \quad (9)$$

In this matrix  $\Sigma$ , there are  $(n^2-n)/2$  number of restrictions required to identify the system. Traditional VAR methodology proposes the identification restrictions based upon on a recursive structure known as Cholesky decomposition (Ioannidis et al., 1995: 256). Cholesky decomposition implies that first variable responds only to its own exogenous shock, the second variable responds to the first variable and its own exogenous shock. This structure gives lower triangular matrix form.

Because of its sensitiveness to ordering of variables, Cholesky decomposition methodology has some critiques from economic profession. These criticisms led to the development of the SVAR approach (McCoy, 1997: 6). The SVAR approach, as advocated by Sims (1980), Bernanke (1986) and Blanchard and Watson (1986), estimates the structural parameters by imposing contemporaneous structural restrictions based on economic theory.

McCoy (1997) summed up SVAR methodology as a standard VAR where the restrictions needed for identification of the underlying structural model are provided

by economic theory which can be either contemporaneous or long run restrictions depending on whether economic theory suggests. He implied that long-run empirical analysis can be more attractive for economists because there is more agreement on the long-run properties of economic theory.

Blanchard and Quah (1989) structured an alternative SVAR approach and considered the shocks as having permanent effects. This would imply that variables are non-stationary since the shocks continue to accumulate through time given they are permanent. The presence of unit roots in the variables can give rise to spurious regression if the VAR is estimated in levels (McCoy, 1997: 7). For this reason it is necessary to use first difference of variables in the case of shocks have permanent effects.

In the case where the shocks are temporary effects on the variables the restrictions are imposed on the contemporaneous elements contained in  $A$ ,  $C$  and  $\Sigma$ . In contrast where the shocks are assumed to have permanent effects, the restrictions are imposed on the long-run multipliers in the impulse response functions, which in effect involves restrictions on  $D(L)$  (McCoy, 1997: 8). The long-run multipliers can be derived from a moving average representation of equation (7) as below:

$$y = [I - D(L)L]^{-1} e_t = [I - D(L)L]^{-1} A^{-1} C \varepsilon_t = \mu(L) \varepsilon_t \quad (10)$$

The term  $\mu(L) = \sum_{i=0}^{\infty} \mu_i L^i$ , where each  $\mu_i$  is the impact of changes in the shocks  $\varepsilon_t$

as reflected in the response of the variable  $y_{t+i}$ . These  $\mu_i$  are the impact multipliers and the sum of these responses to infinity is the long run multiplier of each variable. The set of these multipliers is the impulse response function.

We construct our restrictions as follows. First of all, we try to separate contemporaneous shocks and permanent shocks from each other. To do so, we assume that import demand is a function of innovations upon itself and we expect that import demand would increase through the positive shocks upon itself. This assumption provides three restrictions. Another assumption is that national cash flow will be affected by only an innovation in import demand and an innovation upon itself. Because import quantity exists in the definition of national cash flow and this provides two more restriction. The third identifying assumption is that relative prices would be contingent upon the structural innovations on import demand, national cash flow and itself. This assumption provide us the last restriction on  $D(L)$ . The representation of  $D(L)$  is as follows,

$$D(L) = \begin{bmatrix} z_{11} & 0 & 0 & 0 \\ z_{21} & z_{22} & 0 & 0 \\ z_{31} & z_{32} & z_{33} & 0 \\ z_{41} & z_{42} & z_{43} & z_{44} \end{bmatrix} \quad (11)$$

After the identification of restrictions, next step is to determine impulse response function (IRF) that is employed to reflect the dynamic effect of each exogenous variable response to the individual unitary impulse from other variables. The IRF can explain the current and lagged effect over time of shocks in the error term (Liu et al., 2008: 243).

The variance decomposition is another test to understand dynamic relationship between variables in the VAR analysis. Variance decomposition gives information about dynamic structure of system. The main purpose of variance decomposition is to introduce effects of each random shock on prediction error variance for future periods (Ozgen and Guloglu, 2004: 9).

### 3. Empirical Results

In order to find the stationary of the series, or in other words whether they include roots or not, DF-GLS developed by Elliot, Rothenberg, Stock (1996) and KPSS unit root tests developed by Kwiatkowski, Phillips, Schmidt and Shin (1992) is used. In KPSS test that depends on Langrangean multiplier principle, different from the other unit root tests in literature, null hypothesis means trend stationary (average stationary) as it distinguishes series from deterministic trend (Ozgen and Guloglu, 2004: 14). DF-GLS tests, on the other hand, distinguish the series from the trend and eliminate the autocorrelation. Having an asymptotic distribution, when deterministic terms take place, this test gives better results compared to Dickey Fuller unit root test. (Ozgen and Guloglu, 2004: 16).

**Table 2. Results of Kwiatkowski-Phillips-Schmidt-Shin (KPSS) Unit Root Test**

	Levels		First Differences	
	Intercept*	Trend+ Intercept **	Intercept*	Trend+ Intercept **
m	0.9461	0.2479	0.1546	0.0375
ncf	1.0191	0.0318	0.2663	0.2347
rp	1.0467	0.1469	0.0544	0.0382
crd	1.2778	0.2520	0.4247	0.1183
imkb	1.1177	0.0601	0.0221	0.0136
deprate	0.8690	0.2715	0.5178	0.1372
spr	0.9992	0.1757	0.0694	0.0736
exmar	1.0319	0.2540	0.2470	0.0539

\*The asymptotic critical values of LM statistic for intercept 0.739, 0.463 at the %1 and %5 levels.

\*\* the asymptotic critical values of LM statistic for trend and intercept 0.216, 0.146 at the %1 and %5 levels.

**Table 3. Results of DF-GLS Unit Root Test**

	Levels		First Differences	
	Without Trend*	With Trend**	Without Trend*	With Trend**
m	-0.6120 [0]	-1.9994 [0]	-0.6124 [11]	-1.3200 [11]
ncf	3.5040 [11]	-1.2255 [11]	-0.2825 [11]	-2.4791 [11]
rp	-0.8036 [2]	-3.5667 [1]	-5.9175 [0]	-7.0377 [1]
crd	2.2713 [1]	-1.0127 [1]	-4.5570 [0]	-5.3507 [0]
imkb	-1.0307 [1]	-5.4584 [0]	-1.6478 [5]	-12.7176 [0]
deprate	0.1411 [1]	-1.1662 [1]	-5.8589 [0]	-6.0658 [0]
spr	-0.1937 [1]	-1.9610 [1]	-6.5327 [0]	-7.1071 [0]
exmar	-0.1540 [4]	-3.2228 [0]	-0.9475 [5]	-10.7073 [0]

\* The asymptotic critical values for without trend -2.591, -1.944 at the %1 and %5 levels.

\*\* The asymptotic critical values for with trend -3.602, -3.1772 at the %1 and %5 levels. The figures in parenthesis denote the number of lags in the tests that ensure white noise residuals. They were estimated through the Schwarz criterion.

Although KPSS and DF-GLS unit root tests have advantageous sides for each other, it has been observed that all the variables that were dealt with are not stable in grade values. Thus, when the first difference of the variables [I(1)] that were taken to analysis extent according to the fact that both test results are taken, it becomes stable. Dickey-Fuller type unit root tests generally tend to refuse the null hypothesis when there is a structural break. In this case, for a stationary series in reality, the tests tend to



accept the alternative hypothesis which defines that the series includes unit root (Perron, 1989: 1361). Lumsdaine-Papell (1999) and Lee-Strazicich (2003, 2004) tests are the instances for double structural break and endogenously determined tests. Lee-Strazicich (2003) test alternative hypothesis states the stationary of the trend. In other words, Lee -Strazicich (2003, 2004) unit root test helps to find two structural breaks (LM, Langrange Multiplier). Only Model A and C take place in Lee-Strazicich (2003) unit root tests. Model A gives the grade break and Model C gives both the grade and trend break. (Temurlenk and Oltulular, 2007: 4).

Model A;

$$\Delta y_t = K + \phi y_{t-1} + \beta t + \theta_1 D U_{1t} + \theta_1 D T_{2t} + \sum_{j=1}^k d_j \Delta y_{t-j} + \varepsilon_t \quad (12)$$

Model C;

$$\begin{aligned} \Delta y_t = & K + \phi y_{t-1} + \beta t + \theta_1 D U_{1t} + \theta_2 D T_{1t} + \theta_2 D U_{2t} \\ & + \theta_1 D T_{2t} + \gamma_1 D T_t + \sum_{j=1}^k d_j \Delta y_{t-j} + \varepsilon_t \end{aligned} \quad (13)$$

Here,  $\Delta$  is the first difference operator,  $\varepsilon_t$  is the white noise disturbance term with variance  $\sigma^2$ ; and  $t=1, \dots, T$  is an index of time. The  $\Delta y_{t-j}$  terms on the right-hand side of equation (12) and (13) allow for serial correlation and ensure that the disturbance term is white noise.  $D U_t$  is an indicator dummy variable for a mean shift occurring at time  $TB$  and  $D T_t$  are the corresponding trend shift variables, where; (Narayan and Smyth, 2005: 1109- 1116).

$$D U_t = \begin{cases} 1 & t > TB \text{ otherwise} \\ 0 & \end{cases} \quad D T_t = \begin{cases} t - TB & t > TB \text{ otherwise} \\ 0 & \end{cases} \quad (14)$$

**Table 4. Results of Lee-Strazicich Unit Root tests**

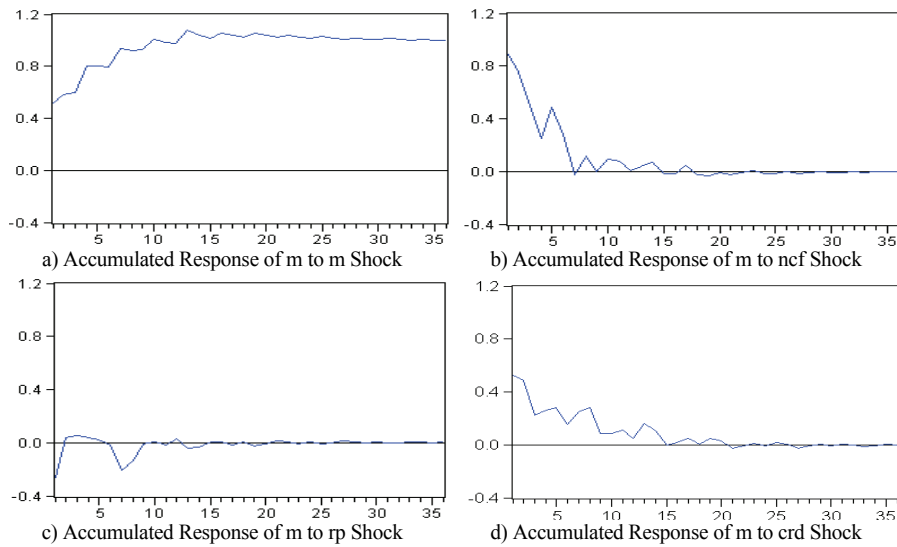
	Model A			Model C		
	Min. t stat.	Break 1	Break 2	Min. t stat	Break 1	Break 2
m	-10.636	10.2004 (0)* [1.1921]**	08.2007 (0)* [0.8109]**	-11.4847	08.2007 (0)* [4.5026]**	11.2007 (0)* [-3.7395]**
ncf	-10.760	02.2006 (0)* [-0.1519]**	06.2007 (0)* [-0.2204]**	-11.5348	09.2007 (0)* [3.1367]**	02.2008 (0)* [-2.7382]**
rp	-10.248	02.2005 (0)* [0.5266]**	05.2007 (0)* [0.0119]**	-11.4971	01.2008 (0)* [4.9460]**	04.2008 (0)* [-3.4921]**
crd	-10.797	06.2006 (0)* [-0.1926]**	11.2007 (0)* [-0.2317]**	-11.4288	01.2008 (0)* [2.8263]**	06.2008 (0)* [-2.1952]**
imkb	-2.5797	09.2005 (1)* [-1.0159]**	12.2006 (1)* [-0.4385]**	-9.6718	12.2006 (0)* [2.8762]**	06.2008 (0)* [-8.5323]**
deprate	-4.8225	04.2004 (1)* [-0.2422]**	02.2007 (1)* [-0.6998]**	-11.4396	06.2008 (0)* [1.5127]**	09.2008 (0)* [-3.2635]**
spr	-4.1471	10.2005 (1)* [2.0483]**	03.2007 (1)* [0.6833]**	-11.0065	04.2008 (0)* [8.8627]**	08.2008 (0)* [-2.8782]**
exmar	-10.5961	09.2005 (0)* [-0.1108]**	02.2007 (0)* [-0.1868]**	-12.2831	09.2008 (0)* [4.2719]**	02.2009 (0)* [-4.1526]**

\* Figures in parenthesis below the lag lengths are selected using the Akaike Information criterion.

\*\* The critical values for the Lee-Strazicich (2003) test is Model A : -4.545, -3.842 and -3.504; Model C : -5.823, -5.286 and -4.989 at the 1%, 5% and 10% levels.

Lee and Strazicich (2003, 2004) claim an endogenous two-break LM unit root test that allows for breaks under both null and alternative hypotheses. In addition, Lee-Strazicich's (2003, 2004) unit root test arrestingly the choice of lag length is crucial. Model A allows for two shifts in level and model C allows for two breaks in level and trend. The test results that were done on monthly series in Table 4 were meaningful in 1% and 5 % significance levels and the break dates were determined. As the assumption of the test requires, null hypothesis was denied and alternative hypothesis was accepted. Thus, in the years 2007 for import, 2008 for national cash flow, share price, interest rate on deposit, relative price and credit volume, 2006 for stock composite index, trading volume of foreign exchange market 2007 and 2008, the break was observed.

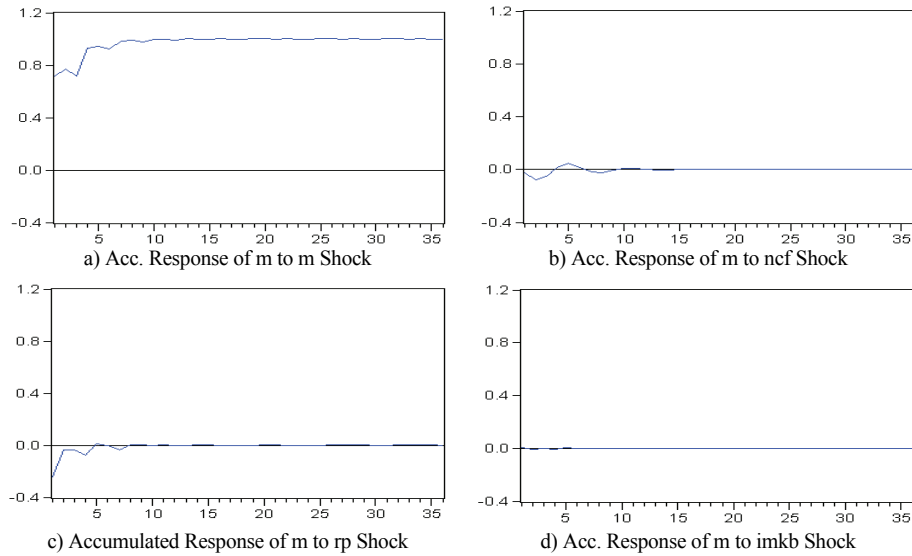
According to unit root test results all variables are  $I(1)$ . To provide stationary condition of the reduced VAR model and ensure stationary in the case of shocks that have permanent effects as in Blanchard and Quah (1989), we include all variables in first differences in the analysis. Another important process in the VAR models is to select the optimal lag length. The most common and simple approach in selecting exact lag length is to re-estimate VAR model until the smallest Akaike Information Criterion (AIC) value is found. Because comparing two or more models, the model with the lowest AIC is preferred (Gujarati, 2004: 537). According to Asteriou (2005) the judgment of the optimal length should still take other factors into account: for example autocorrelation, heteroskedasticity, possible ARCH effects and normality of residuals.



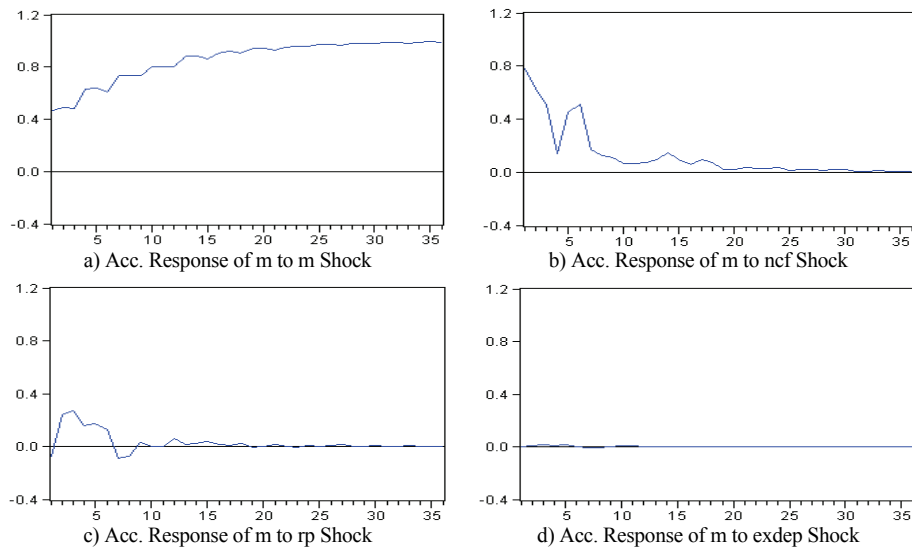
**Figure 2. Impulse-Response Graphics of Model 1**

We examine import demand functions including each financial variables separately and we find six lags for equation (1) including credit volume, three lags for equation (2) including stock market transaction volume, six lags for equation (3) including exchange market transaction volume (3) and three lags for equation (4) including deposit interest rate. In order to test stability of models, we control characteristic roots of the matrix coefficients if they have a modulus less than one. We use autocorrelation test and unit root graph to test lag structure and stability of the number of the lag length. Results conclude that all roots are less than one and no roots are out of the unit

circle. Also null hypothesis assuming that there is no correlation between error variances up to 12 lags was accepted in 1% confidence interval.



**Figure 3. Impulse-Response Graphics of Model 2**

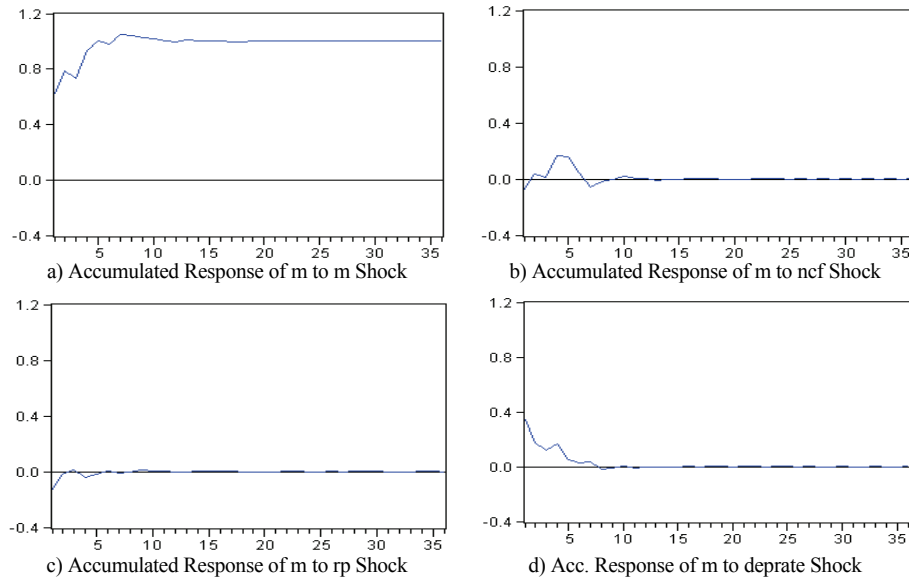


**Figure 4. Impulse-Response Graphics of Model 3**

Figure 2 presents accumulated response of import demand to a structural shock in variables of model 1. Response of import demand to a positive innovation in national cash flow is positive. Effect of innovation decreases gradually in six months and then it dies out. A positive shock in relative prices affects import demand negatively in first impact. But it turns to positive after first month and dies out after fluctuated for a year. Response of import demand to a shock in total credit volume in the banking sector is valid for more than twenty months and it is positive along this period.

Figure 3 shows accumulated response of import demand to a shock in national cash flow, relative prices and stock market transaction volume. Results are summarized as follows. Including stock market transaction volume decreased responsiveness of import demand to national cash flow and relative prices. Response of import demand to a shock in national cash flow is positive after a quarter but the response is so small and finishes in a year unnecessarily. Response of the import demand to a shock in relative prices is negative and it turns positive fifth months after shock but it is unnecessarily small. According to results, an innovation in stock market transaction volume does not have any effect on import demand. It would not response to any shock in stock market.

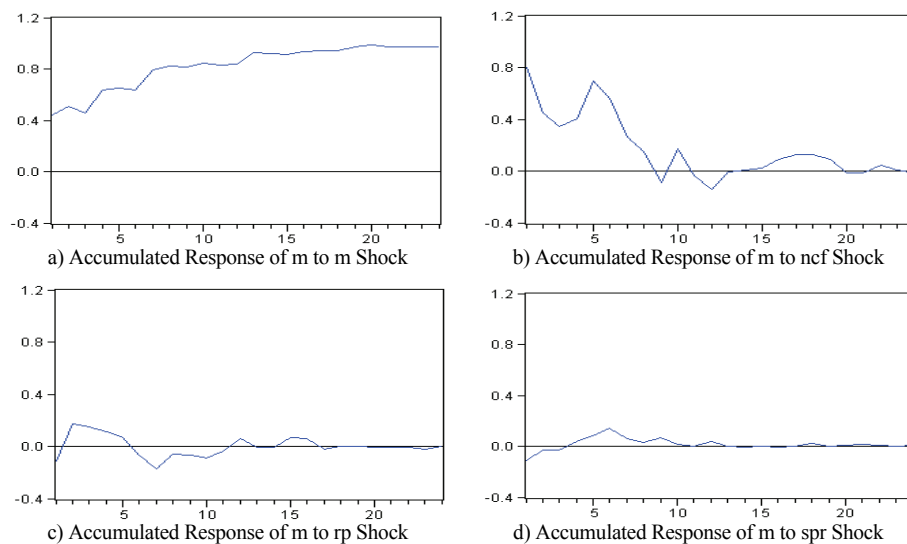
Figure 4 presents impulse response function results for model (3) which includes exchange market transaction volume. According to results import demand responses positively to an innovation in national cash flow and relative prices. Effect of national cash flow innovation continues more than two years and effect of relative price innovation continues less than a year positively. According to results import demand does not response to a shock in exchange market transaction volume.



**Figure 5. Impulse-Response Graphics of Model 4**

In the figure 5 accumulated response functions of variables belonging equation 4 is presented. According to results, responses of import demand to national cash flow and interest rate of deposit shocks are positive and both of them die out in a year. Effect of an innovation in relative price to import demand is unnecessarily small and negative. It already dies out in a quarter. Share prices are included in model 5 and accumulated response of import demand in the model is presented in figure 6. According to results, response of import demand is positive to a shock in national cash flow and it is effective more than a year. Although response is negative for relative prices and share prices in first impact, it turns to positive in the following months and continues more than a year.

In order to see explanatory power of variables to a shock in import demand, we use variance decomposition methodology. In model 1, national cash flow is the main explanatory variable of import demand shock. It can explain shock up to 56% during 36 months. While relative prices can explain shock up to 10%, credit volume in banking sector is another main explanatory and it explain 20% of variance in import demand. In model 2, explanation ability of national cash flow decreased although relative prices can explain variance up to 16%. In this model we have included stock market transaction volume and but according to variance decomposition results it has no ability to explain import demand variance. In model 3, national cash flow is the main variable to explain variance in import demand as in model 1. It explains variance up to 70%. Also share of relative prices increased up to 12%. Another variable belonging financial system, exchange market transaction volume does not have explanation ability in variance of import demand like stock market transaction volume.



**Figure 6. Impulse-Response Graphics of Model 5**

By including interest rate of deposits into model 4, import demand was the main explanatory variable of a variance in itself and national cash flow and relative prices lost explanation abilities. Variable of financial system is also another important variable explain variance up to 22%. In the last model, we have included share prices into model. In this model national cash flow is the main explanatory variable as like in model 1 and 3. Relative prices are the other explanatory variable of variance in import demand up to 10%. Share prices have just a little explanation ability and it is not more than 3%.

#### 4. Conclusion

In this study, we include important variables of financial system into import demand model to build up a stable import demand for the Turkish economy on the long-term and to understand effects of financial system on import demand. Accumulated response of import demand to an innovation in national cash flow is positive. But including variable belonging financial system affects response of import demand to national cash flow. It increases when total credit volume, interest rate and share prices

are included into model and it decreases when we include stock market transaction volume and exchange market transaction volume. We found that accumulated response of import demand to a shock in relative prices is negative in first impact then it turns to positive after a month with financial variables or without them. But it is clear that stock market volume and exchange market transaction volume affect responsiveness of import demand to relative prices negatively. When we examine variables belonging financial system, it is clear that total credit volume in the banking sector and interest rate of deposit have positive effects on import demand as Leamer and Stern (1970) emphasized in their study. Also share prices shock is effective on import demand and it increases when there is a positive shock on share prices. But response of import demand to total credit value is longer than the others and it continues more than two years significantly. We found also that import demand has no response to a shock in exchange market and stock market transaction volume.

We examine variance decomposition of import demand and we concluded that national cash flow can explain up to 70% of variance in import demand. While credit volume, interest rate and share prices increase explanation ability of national cash flow, other variables reduce it. Relative prices can explain a shock in import demand up to 15% and credit Explanation ability of relative prices is high and it can explain up to 15% percentage. Also variables of financial system affect it ability also like national cash flow. The most useful financial variable to explain variance of import demand is interest rate of deposits and it can explain up to 22%. Another one is total volume of credit in financial system and it can explain up to 20%. Another efficient variable is the share prices and but it can explain only up to 3%. Other two variable have no ability to explain variance of import demand in long term.

All these results indicate that including financial system into import demand might be effective to build a stable import demand function for Turkey. Effects of credit and interest rate on import demand correct Leamer and Stern's (1970) piece of advises about import demand structure. Results of analysis imply that effects of financial system on import demand must be taken into consideration by the Central Bank of the Republic of Turkey in policy making process.

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